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Annual retest of POP Requirements of wirebound box for small caliber ammunition packed in  
M2A1 Metal Container.

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Edgardo B. Silvestre

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3. M2A1	

19. ABSTRACT (Continue on reverse if necessary and identify by block number)

This report covers the annual retest of POP Requirements of wirebound box, part No. 7553347, used as shipping container for small caliber ammunition. The exterior wirebound box contains two M2A1 metal inner containers (dwg 7553296) containing various small armed ammunition, items of different quantities and weights. Tests were conducted using additional test weights to insure the integrity of the shipping container.

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SMCAR-AEP

**Best  
Available  
Copy**

ANNUAL RETEST OF  
 PERFORMANCE ORIENTED PACKAGING REQUIREMENTS  
 OF  
 WIREBOUND BOX FOR SMALL CALIBER AMMUNITION  
 PACKED IN M2A1 METAL CONTAINER  
 FOR

DTIC QUALITY INSPECTED 8

PACKING GROUP II  
 SOLID HAZARDOUS MATERIALS

Author:

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 PACKAGING TECHNOLOGIST

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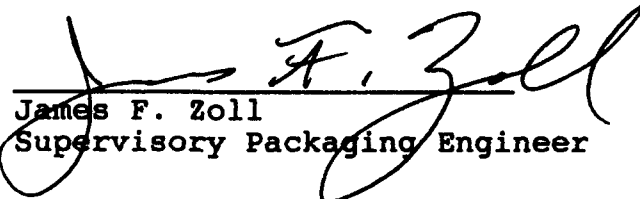

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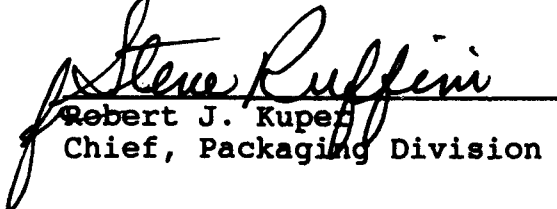
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## INTRODUCTION

The Department of Transportation (DOT) per CFR 49, Parts 100-179, dated 1 October 91, requires that hazardous materials should be packed in a container that passes the Performance Oriented Packaging (POP) tests. Furthermore, these tests are to be repeated on an annual basis for items in production.

Wirebound box, part number 7553347, is being used as shipping container for small caliber ammunition. This box contains two(2) M2A1 metal containers containing various small arms ammunition items of different quantities and weights. This box contains a maximum gross weight of 54 kg.

POP tests were conducted using additional weight(62 kg test weight) to insure container integrity. The tests were conducted in accordance with the referenced sections of CFR 49 and are valid only when the approved items are packed in the M2A1 container for the DOD(see Tables). This wirebound box was tested previously and certified for 54 Kg of gross weight of Packing Group II Items. This report represents the annual retest of the wirebound box for M2A1 for POP certification.

## TESTS PERFORMED

### 1. Drop Test

Section 178.603 of CFR 49 specifies that one box each should be used for each drop orientation. Five (5) boxes were used for five different orientations. Containers were tested to Packing Group II requirements.

One box each was dropped from a height of 1.2 meters (3.9 ft.) in the following orientations: flat on bottom, flat on top, flat on long-side, flat on short-side and on a corner.

### 2. Vibration Test

Three (3) boxes were placed on the vibrating platform and vibrated for a duration of one hour. The boxes were unrestrained except horizontally to prevent them from falling off of the platform. The peak-to-peak displacement was one inch and the frequency was 4.6 Hertz/sec. This frequency was sufficient enough to allow the package to become completely airborne, enabling a 1/16 inch (.16 cm) thick piece of strapping material to be slid underneath the package during testing.

### 3. Stacking Test

Section 178.606 of CFR 49 requires that the minimum height of the stack including the test sample must be 3.0 meters (10 ft). Three test samples are required.

A 3.0 meter stack height of samples is equivalent to 2,046 lbs. (930 kg) of stack weight. Three different test samples were each subjected to a stack weight of 2,046 lbs for a period of 24 hours. The samples were then inspected and examined for any damage or distortion.

#### PASS/FAIL (DOT CRITERIA)

A package for explosives is considered to successfully pass the drop tests if for each sample tested, no rupture of the packaging occurs.

A packaging passes the vibration test if there is no rupture or leakage from any of the packages.

A test sample passes the stacking test when no test sample leaks. No test sample may show any deterioration which could adversely affect transportation safety or any distortion likely to reduce its strength or cause instability in stacks of packages.

#### TEST RESULTS

##### 1. Drop Test - Result: pass, no spillage.

The first four drops did not do any damage on any of the four boxes. On the edge drop, one of the long side of the box cracked but there was no spillage.

##### 2. Vibration Test - Result: pass, no spillage or damage.

All three boxes were removed from the platform after one hour vibration. Each of the boxes was turned on its side and inspected for any damage and leakage. The packages were all tightly intact and showed no evidence of deterioration.

3. Stacking Test - Result: pass, no evidence of distortion.

The stacking test was performed with the use of a forklift to apply a dead load of 2,046 lbs on top of each of the three boxes. Each of the boxes adequately supported the applied load. No evidence of box distortion was noted.

REMARK

Based on the successful POP testing outlined in this report, the following POP symbol:

last two digits of  
year packed

(u) 4C1/Y54/S/□□  
n USA/DOD/AYD

shall be applied to containers manufactured in accordance with drawing 7553347 when used to package the NSN's listed in Tables I to VI for items packed from October 1993 through October 1994.

REFERENCE MATERIAL

1. Federal Register, "49 CFR Part 107, 1 Oct 91
2. Federal Specification PPP-B-585

## TEST DATA

## DATA

## Container(Outer):

Type: Box, wirebound  
Part No.: 7553347  
UN Code : 4C1  
Spec No.: PPP-B-585  
Material: Wood  
Capacity: 19.1 liters  
Dimensions  
    Inside: 31.52 cm x 30.96 cm x 19.53 cm  
            (12 3/16 in x 12 1/16 in x 7 9/16+1/8 in)  
  
    Outside: 36.67 cm x 31.83 cm x 20.64 cm  
            (14 7/16 in x 12 17/32 in x 8 1/8 in)

Weight(empty) : 2.5 kg (5.5 lbs)

## Container(inner):

Type : Box  
Model No : M2A1  
Spec No: : MIL-B-3060  
Material : Metal  
Capacity : 6.8 liters  
Dimensions:  
  
    Inside : 27.94 cm x 14.13 cm x 17.22 cm  
            (11 in x 5 9/16 in x 6 25/32 in)  
  
    Outside : 30.56 cm x 15.48 cm x 19.05 cm  
            (12 1/32 in x 6 3/32 in x 7 1/2 in)

Weight : 2.5 kg(5.5 lbs)  
Closure(Method/Closure): Hinged Lid



**PRODUCTS :**

Identification No. : See Tables I - VI  
UN Packing Group : II  
Physical State : Solid  
Amount per Container : See Tables I - VI

**TEST MATERIALS:**

Name : Simulated Weights and Sand  
Physical State : Solid  
Size : 10 in x 3 in x 3 in  
or 2 in dia x 7/8 in thick  
or granulated sand  
Quantity : Twelve(12) lead weights  
or lead tablets  
or 136 lbs  
Dunnage : Polyethylene foam per PPP-C-1752  
Gross Weight : 136 lbs(62 kg)

TABLE I

DODIC OR NALC	NSN	HM ITEM	TYPE	HAZARD CLASS	UN NO.	LBS/W.BX	KG/W.BX
A080	1305-00-182-3217	5.56mm	Blank	1.4S	0014	64	29
A068	1305-00-914-4719	5.56mm	Tracer	1.4S	0012	66	30
A072	1305-00-926-3929	5.56mm	Tracer	1.4S	0012	70	32
A071	1305-00-926-3930	5.56mm	Ball	1.4S	0012	75	34
A066	1305-00-926-3970	5.56mm	Ball	1.4S	0012	70	32
A073	1305-00-935-9253	5.56mm	Ball / Tracer	1.4S	0012	81	37
A068	1305-00-965-0832	5.56mm	Tracer	1.4S	0012	48	22
A058	1305-01-155-5455	5.56mm	Ball	1.4S	0012	68	31
None	1305-01-155-5456	5.56mm	Ref.	1.4S	0012	68	31
A063	1305-01-155-5457	5.56mm	Tracer	1.4S	0012	68	31
A058	1305-01-155-5458	5.56mm	Ball	1.4S	0012	81	37
A059	1305-01-155-5459	5.56mm	Ball	1.4S	0012	81	37
A062	1305-01-155-5461	5.56mm	Ball	1.4S	0012	73	33
A059	1305-01-155-5462	5.56mm	Ball	1.4S	0012	81	37
A075	1305-01-155-5463	5.56mm	Blank	1.4S	0014	40	18
A075	1305-01-155-5464	5.56mm	Blank	1.4S	0014	40	18
A064	1305-01-156-7584	5.56mm	Ball / Tracer	1.4S	0012	48	22
A062	1305-01-174-9277	5.56mm	Ball	1.4S	0012	81	37
A075	1305-01-174-9278	5.56mm	Blank	1.4S	0014	40	18
A071	1305-01-255-6276	5.56mm	Ball	1.4S	0012	79	36
A072	1305-01-258-8693	5.56mm	Tracer	1.4C	0339	79	36
G841	1330-00-764-8435	5.56mm	Grenade	1.4S	0014	62	28
A064	1305-01-131-5246	5.56mm	Ball/Tracer	1.4S	0012	48	22
A066	1305-00-773-1257	5.56mm	Ball	1.4S	0012	55	25
A066	1305-00-968-5892	5.56mm	Ball	1.4S	0012	59	27
A080	1305-00-005-8005	5.56mm	Blank	1.4S	0014	53	24
A080	1305-00-764-8436	5.56mm	Blank	1.4S	0014	57	26
A080	1305-00-926-9302	5.56mm	Blank	1.4S	0014	51	23

TABLE II

DODIC OR NALC	NSN	HM ITEM	TYPE	HAZARD CLASS	UN NO.	LBS/W. BX	KG/W. BX
A136	1305-00-064-2896	7.62mm	Spl Ball	1.4S	0012	73	33
A131	1305-00-143-7163	7.62mm	Ball / Tracer	1.4S	0012	59	27
A102	1305-00-182-3096	7.62mm	Ball	1.4S	0012	57	26
A103	1305-00-182-3126	7.62mm	Blank	1.4S	0014	75	34
A143	1305-00-257-1089	7.62mm	Ball	1.4S	0012	59	27
A130	1305-00-555-4275	7.62mm	Ball	1.4S	0012	73	33
A129	1305-00-580-0131	7.62mm	HPT	1.4S	0012	79	36
A122	1305-00-914-4676	7.62mm	Ball	1.4S	0012	68	31
A140	1305-00-926-4017	7.62mm	Tracer	1.4S	0012	68	31
A166	1305-00-935-9289	7.62mm	Overhead Fire	1.4S	0012	77	35
A167	1305-00-935-9290	7.62mm	O.F. Tracer	1.4S	0012	73	33
A149	1305-00-965-0601	7.62mm	Ball	1.4S	0012	66	30
A112	1305-00-990-5594	7.62mm	Blank	1.4S	0014	59	27
A171	1305-01-120-0970	7.62mm	Match	1.4S	0012	73	33
G839	1330-01-077-4291	7.62mm	Grenade	1.4S	0012	64	29
A122	1305-00-892-4152	7.62mm	Ball	1.4S	0012	70	32
A124	1305-00-882-5678	7.62mm	Tracer	1.4S	0012	77	35
A136	1305-00-064-2896	7.62mm	Match	1.4S	0012	75	34
A130	1305-00-147-2989	7.62mm	Ball	1.4S	0012	75	34
A130	1305-00-231-4630	7.62mm	Ball	1.4S	0012	75	34
A130	1305-00-542-1219	7.62mm	Ball	1.4S	0012	75	34
A130	1303-00-752-8836	7.62mm	Ball	1.4S	0012	70	32
A130	1305-00-914-4675	7.62mm	Ball	1.4S	0012	70	32
A149	1305-00-828-8907	7.62mm	Tracer	1.4S	0012	77	35
A128	1305-00-542-1968	7.62mm	Ball	1.4S	0012	81	37

TABLE III

DODIC OR NALC	NSN	HM ITEM	TYPE	HAZARD CLASS	UN NO.	LBS/W. BX	KG/W. BX
B475	1310-00-133-9413	40mm	Smoke Signals	1.4G	0197	46	21
B535	1310-00-159-3198	40mm	Signal Flare	1.4G	0312	46	21
B477	1310-00-179-1163	40mm	Smoke Signals	1.4G	0197	46	21
B479	1310-00-179-1170	40mm	Smoke Signals	1.4G	0197	46	21
B504	1310-00-541-6148	40mm	Signal Flare	1.4G	0312	46	21
B505	1310-00-541-6149	40mm	Signal Flare	1.4G	0312	46	21
B506	1310-00-541-6150	40mm	Smoke Signals	1.4G	0197	46	21
B508	1310-00-541-6152	40mm	Smoke Signals	1.4G	0197	46	21
B509	1310-00-541-6153	40mm	Smoke Signals	1.4G	0197	46	21
B536	1310-00-922-9784	40mm	Signal Flare	1.4G	0312	46	21
B519	1310-01-107-5404	40mm	Practice	1.4C	0339	46	21
B476	1310-00-179-1159	40mm	Smoke Signal	1.4G	0197	46	21
B478	1310-00-179-1168	40mm	Smoke Signal	1.4G	0197	46	21
B535	1310-00-922-9780	40mm	Illum Signal	1.4G	0312	46	21
B534	1310-00-963-4061	40mm	Anti-Personnel	1.4S	0012	25	24
B567	1310-00-849-2083	40mm	Chemical Agent	1.4G	0301	15	07

TABLE IV

DODIC OR NALC	NSN	HM ITEM	TYPE	HAZARD CLASS	UN NO.	LBS/W. BX	KG/W. BX
A201	1305-00-028-6162	Cal .30	AP	1.4S	0012	81	37
A202	1305-00-028-6185	Cal .30	AP	1.4S	0012	75	34
A201	1305-00-028-6187	Cal .30	AP	1.4S	0012	75	34
A216	1305-00-028-6215	Cal .30	CLPD	1.4S	0012	77	35
A222	1305-00-047-3871	Cal .30	HUNK	1.4S	0014	62	28
A182	1305-00-301-1661	Cal .30	CLPD	1.4S	0012	73	33
A182	1305-00-301-1662	Cal .30	CLPD	1.4S	0012	68	31
A224	1305-00-301-1670	Cal .30	HUNK	1.4S	0014	59	27
A201	1305-00-542-1119	Cal .30	AP	1.4S	0012	62	28
A201	1305-00-936-2317	Cal .30	AP	1.4S	0012	79	36

TABLE V

DODIC OR NALC	NSN	HM ITEM	TYPE	HAZARD CLASS	UN NO.	LBS/W. BX	KG/W. BX
A404	1305-00-123-0548	Cal .38	Ball	1.4S	0012	92	42
A475	1305-00-301-1685	Cal .45	Ball	1.4S	0012	112	51
A480	1305-00-301-1686	Cal .45	HPT	1.4S	0012	110	50
A400	1305-00-322-6391	Cal .38	Spl Ball	1.4S	0012	92	42
A397	1305-00-553-4779	Cal .38	Ball	1.4S	0012	62	28
A482	1305-00-752-7910	Cal .45	Match	1.4S	0012	95	43
A476	1305-00-753-2304	Cal .45	Blank	1.4S	0014	44	20
A483	1305-00-892-2526	Cal .45	Match	1.4S	0012	114	52
A479	1305-00-905-6788	Cal .45	Tracer	1.4S	0012	108	49
A363	1305-01-172-9558	9mm	Ball	1.4S	0012	79	36
A364	1305-01-173-2397	9mm	HPT	1.4S	0012	79	36
A011	1305-01-232-8338	12 GA	Shot Shell	1.4S	0012	52	24
A086	1305-00-305-0902	Cal .22	Ball	1.4S	0012	99	45
A091	1305-00-810-8249	Cal .22	Ball	1.4S	0012	101	46
A358	1305-01-214-8684	9mm	Practice	1.4S	0012	119	54
A014	1305-00-147-5568	12 GA	Shot Shell	1.4S	0012	40	18
A017	1305-00-146-1187	12 GA	Shot Shell	1.4S	0012	40	18
A575	1305-00-126-3852	Cal .50	HPT	1.4C	0339	77	35
A552	1305-00-585-5191	Cal .50	Ball	1.4C	0339	79	36
A541	1305-00-585-5194	Cal .50	APTT	1.4G	0300	73	33
A090	1305-01-120-4105	Cal .22	Tracer	1.4S	0012	119	54
A360	1305-00-935-6164	9mm	Ball	1.4S	0012	99	45
A403	1305-00-810-8250	Cal .38	Blank	1.4S	0014	48	22

TABLE VI

LINE DODIC NO OR NALC	NSN	HM ITEM	TYPE	HAZARD CLASS	UN NO.	LBS/W. BX	KG/W. BX
1 A553	1305-00-028-6336	Cal .50	Ball	1.4C	0339	79	36
2 A555	1305-00-028-6574	Cal .50	Ball	1.4C	0339	77	35
3 A557	1305-00-028-6583	Cal .50	Ball / Tracer	1.4C	0339	77	35
4 A543	1305-00-028-6601	Cal .50	API	1.4G	0300	77	35
5 A576	1305-00-028-6603	Cal .50	API / API	1.4G	0300	77	35
6 A527	1305-00-096-3141	Cal .50	AP	1.4C	0339	75	34
7 A574	1305-00-164-5343	Cal .50	Spotter Tracer	1.4C	0339	75	34
8 A562	1305-00-301-1643	Cal .50	Incendiary	1.4G	0300	75	34
9 A564	1305-00-305-0894	Cal .50	Incendiary	1.4G	0300	77	35
10 A571	1305-00-585-5188	Cal .50	Tracer	1.4C	0339	79	36
11 A546	1305-00-585-5368	Cal .50	Ball	1.4C	0339	81	37
12 A589	1305-00-689-4709	Cal .50	API / API	1.4G	0300	70	32
13 A520	1305-00-764-8386	Cal .50	Ball / Tracer	1.4C	0339	68	31
14 A540	1305-00-935-2017	Cal .50	API / Tracer	1.4G	0300	75	34
15 A605	1305-00-935-2109	Cal .50	Ball	1.4C	0339	75	34
16 A574	1305-00-935-6067	Cal .50	Spotter Tracer	1.4C	0339	77	35
17 A579	1305-00-965-0553	Cal .50	Practice	1.4C	0339	77	35
18 A598	1305-01-078-4879	Cal .50	Blank	1.4C	0338	77	35
19 A599	1305-01-085-5118	Cal .50	Blank	1.4C	0338	48	22
20 A603	1305-01-126-6200	Cal .50	TP-T	1.4S	0012	35	16
21 A602	1305-01-126-6201	Cal .50	TP-T	1.4S	0012	77	35
22 A595	1305-01-127-7870	Cal .50	TP-T	1.4S	0012	48	16

TABLE VI

LINE DODIC NO OR NALC	NSN	HM ITEM	TYPE	HAZARD CLASS	UN NO.	LBS/W. BX	KG/W. BX
23 A520	1305-00-993-7727	Cal .50	B/TR	1.4C	0339	77	35
24 A520	1305-00-993-7728	Cal .50	B/TR	1.4C	0339	77	35
25 A525	1305-00-028-6301	Cal .50	AP	1.4C	0339	68	31
26 A526	1305-00-028-6317	Cal .50	AP	1.4C	0339	68	31
27 A527	1305-00-028-6309	Cal .50	AP	1.4C	0339	79	36
28 A528	1305-00-028-6307	Cal .50	AP	1.4C	0339	79	36
29 A530	1305-00-028-6562	Cal .50	APT	1.4C	0339	77	35
30 A531	1305-00-028-6449	Cal .50	API	1.4G	0300	66	30
31 A533	1305-00-344-2394	Cal .50	API	1.4G	0300	77	35
32 A533	1305-00-028-6474	Cal .50	API	1.4G	0300	77	35
33 A533	1305-00-028-6592	Cal .50	API	1.4G	0300	81	37
34 A534	1305-00-028-6451	Cal .50	API	1.4G	0300	77	35
35 A540	1305-00-028-6471	Cal .50	API/T	1.4G	0300	77	35
36 A541	1305-00-585-5194	Cal .50	API/T	1.4G	0300	79	36
37 A542	1305-00-585-5192	Cal .50	API/T	1.4G	0300	79	36
38 A545	1305-00-555-4057	Cal .50	API	1.4G	0300	81	37
39 A557	1305-00-540-1056	Cal .50	B/TR	1.4C	0339	77	35
40 A557	1305-00-541-9834	Cal .50	B/TR	1.4C	0339	77	35
41 A565	1305-00-756-1411	Cal .50	INC	1.4G	0300	79	36
42 A569	1305-00-123-0564	Cal .50	I/TR	1.4G	0300	79	36
43 A570	1305-00-585-5189	Cal .50	TR	1.4C	0339	79	36
44 A572	1305-00-028-6609	Cal .50	TR	1.4C	0339	79	36



TABLE VI

LINE DODIC NO OR NALC	NSN	HM ITEM	TYPE	HAZARD CLASS	UN NO.	LBS/W. BX	KG/W. BX
45 A573	1305-00-028-6610	Cal .50	TR	1.4C	0339	77	35
46 A574	1305-00-542-0408	Cal .50	SPIR TR	1.4C	0339	66	30
47 A574	1305-00-028-6611	Cal .50	SPIR TR	1.4C	0339	73	33
48 A574	1305-00-554-6745	Cal .50	SPIR TR	1.4C	0339	75	34
49 A577	1305-00-028-6604	Cal .50	API-T	1.4G	0300	77	35
50 A584	1305-00-555-4056	Cal .50	Ball	1.4C	0339	77	35
51 A585	1305-00-618-2400	Cal .50	API-T	1.4G	0300	77	35
52 A586	1305-00-618-2399	Cal .50	TR	1.4C	0339	77	35
53 A587	1305-00-585-1667	Cal .50	API	1.4G	0300	79	36
54 A589	1305-00-752-7891	Cal .50	API-T	1.4G	0300	77	35
55 A590	1305-00-892-4238	Cal .50	API-T	1.4G	0300	73	33
56 A593	1305-00-689-4752	Cal .50	AP/TR	1.4G	0300	73	33
57 A593	1305-00-067-8069	Cal .50	AP/TR	1.4C	0339	75	34
58 A598	1305-00-689-4738	Cal .50	API-T	1.4G	0300	46	21
59 A621	1305-00-028-6582	Cal .50	B/TR	1.4C	0339	77	35